Unit 5 : Determinants

1. What will be the value of $\begin{vmatrix} 3 & 4 \\ 1 & 5 \end{vmatrix}$?

(a) 11 (b) -11 (c) 7 (d) 17

2. Find the value of $\begin{vmatrix} x+y & x \\ x & x-y \end{vmatrix}$.

(a) y^2 (b) $-y^2$ (c) x^2 (d) x^2y^2

3. What is the value of $\begin{vmatrix} a+b & a-b \\ a-b & a+b \end{vmatrix}$?

a) $-4ab$ b) $4ab$ c) $2a^2$ d) $2b^2$

4. Find the value of $\begin{vmatrix} 2+a & 2 \\ 3 & 3+a \end{vmatrix}$.

a) 6 b) $5a-a^2$ c) a^2+5a d) a^2-5a

5. Find the value of $\begin{vmatrix} x+y & -y \\ y & x-y \end{vmatrix}$.

a) $-x^2$ b) y^2 c) x^2 d) $-y^2$

6. Determinant of 3rd order consists of 3 rows and 3 columns with ___ elements.

a) 6 b) 27 c) 9 d) 3

7. Find the value of $\begin{vmatrix} 2 & 5 & -3 \\ 3 & -2 & 5 \\ -1 & 3 & 2 \end{vmatrix}$.

a) 114 b) 110 c) -114 d) 55

8. Expand $\begin{vmatrix} 1 & 1 & 1 \\ bc & ca & ab \\ 1/a & 1/b & 1/c \end{vmatrix}$.

a) 3 b) 1 c) -1 d) 0

9. If ~~the~~ two rows or columns of a determinant are ~~interg~~ interchanged, the value of the determinant is ___.

a) changed only in sign b) same

d) zero d) none of given

10. If the elements of any two rows or two columns of a determinant are Identical, the value of determinant is ____.

a) 0 b) 1 c) -1 d) can't say

11. If the row and column passing through an element of a determinant are deleted, then the determinant obtained from the remaining element is known as ____ of that particular element.

a) major b) minor c) value d) none of given

12. Find x, if $\begin{vmatrix} x & 10 \\ 10 & x \end{vmatrix} = 0$

a) -10 b) 10 c) 0 d) ± 10

13 Find x, if $\begin{vmatrix} 1 & 2 & -3 \\ x & 2 & -5 \\ 4 & -3 & -1 \end{vmatrix} = 0$

a) 3 b) -3 c) 8 d) 11

14 Solve the equations:

$$2x - 9 = 5y$$
$$x - y = 3$$

a) $x=2, y=-1$ b) $x=-2, y=-1$ c) $x=2, y=1$ d) $x=-2, y=1$

15 Solve the equations:

$$y = x + 7 \quad , \quad y = 2x + 15$$

a) $x=8, y=1$ b) $x=1, y=8$ c) $x=-8, y=-1$ d) $x=8, y=-1$

16. Solve the equations:

$$\frac{x}{3} + \frac{y}{4} = 1$$

$$\frac{2x}{9} - \frac{y}{2} = 6$$

a) $x=8, y=9$ b) $x=9, y=-8$

c) $x=9, y=8$ d) $x=-9, y=8$

17. Solve the equations:

$4x + 10y = 2xy$,

$5x + 16y = 3xy$.

a) $x = 7, y = -7$ b) $x = 7, y = 7$.

c) $x = 1/7, y = 1/7$ d) $x = -7, y = -7$

18. Solve the equations using cramer's rule:

$x + 2y + 3z = 14$

$2x + y + z = 7$

$5x + 2y + z = 12$

a) $x = 1, y = 2, z = 3$ b) $x = 1, y = 3, z = 2$.

c) $x = 2, y = 1, z = 3$ d) $x = -1, y = -2, z = -3$

19. Evaluate $\begin{vmatrix} 3x+11 & 3x+10 & 3x+8 \\ 3x+10 & 3x+9 & 3x+7 \\ 1965 & 1964 & 1962 \end{vmatrix}$.

a) 1 b) 0 c) 2 d) 10

20. Find the value of K if $\begin{vmatrix} 4 & 5 & -7 \\ -2 & K & 6 \\ 1 & K & 1 \end{vmatrix} = 43$.

a) 2 b) 10 c) -3 d) 3

21. If m.n numbers are arranged in a rectangular array of m rows & n columns, it is called a ____ of order m x n.

a) matrix b) determinant c) minor d) none of the given

22 The use of matrix is very common in ____.

a) Higher mathematics b) statistics

c) Economics d) All of the given.

23. Two matrix are said to be equal if

a) order of both the matrix is same.

b) The corresponding elements in both the matrices should be the same.

c) both a and b)

d) none of the given

24. If we interchange rows and columns of a matrix, the new matrix so obtained is known as _____.
a) transpose of a matrix b) Inverse of a matrix
c) Adjoint of a matrix d) minor

25 A matrix in which there is only one row and any no. of columns is said to be _____.
a) row matrix b) column matrix
c) symmetric matrix d) identity matrix

26 A matrix in which there is only one column and any no. of rows is said to be _____.
a) row matrix b) column matrix
c) symmetric matrix d) none of these

27. If all the elements of matrix are zero, it is said to be _____
a) Identity matrix b) null matrix
c) row matrix d) singular matrix

28 A matrix in which no. of rows and no. of columns are equal is said to be _____
a) Identity matrix b) square matrix
c) null matrix d) singular matrix

29 For a symmetric matrix,
a) $A^T = A$ b) $A^T = -A$ c) $A^T \neq A$ d) none

30 For a skew symmetric matrix,
a) $A^T = A$ b) $A^T = -A$ c) $A^T \neq A$ d) none.

31 A square matrix in which all diagonal elements are unity and all other elements are 0 is known as _____
(a) Unit matrix b) null matrix
c) zero matrix d) Symmetric matrix

32. If all elements except diagonal elements of a square matrix are 0, the matrix is said to be ___.
a) zero matrix b) Identity matrix
c) diagonal matrix d) null matrix

33. If the order of matrix A is 3X4, then the order of A^T will be ____
a) 3X3 b) 4X4 c) 4X3 d) 3X4

34 $\begin{bmatrix} 1 \\ 2 \\ 5 \end{bmatrix}$ is an example of ___ matrix.
a) row matrix b) column matrix
c) zero matrix d) none of given

35. The order of [1 2 3 4] is ____
a) 4X1 b) 1X4 c) 4X4 d) 1X1

36. A zero matrix can be ____
a) row matrix b) column matrix
c) row or column matrix d) none

37 If the transpose of a square matrix gives the same matrix, it is known as ___ matrix.
a) symmetric b) skew symmetric
c) Transpose d) Equal

38 Every symmetric matrix must be a ____ matrix
a) Square b) Equal
c) row d) none

39. ____ is a symmetric matrix.
a) $A+A^T$ b) $A-A^T$ c) A^T+A^T d) All of above

40 ____ is a skew symmetric matrix.
a) $A+A^T$ b) $A-A^T$ c) A^T+A^T d) A

41 $(A^T)^T$ = ____
a) A^T b) A c) $A+A^T$ d) $A-A^T$

42 If A and B are two mxn matrices then $(A+B)^T$ = ____
a) A^T+B^T b) A^TB^T c) B^TA^T d) none

43 The type of the matrix $\begin{vmatrix} 0 & -3 & 1 \\ 3 & 0 & 5 \\ -1 & -5 & 0 \end{vmatrix}$ is ____.

a) diagonal matrix b) skew-symmetric matrix
c) ~~square~~ square matrix d) both b and c.

44. The addition & subtraction of 2 or more matrices is possible only when they are of the ___ order.

a) different b) same c) zero d) mxn

45. If A is of the order 3x2, B is of the order 3x2 then A+B will be of the order ____.

a) 3x3 b) 2x2 c) 3x2 d) 2x3

46 Two matrices A and B are multiplied to get AB if

a) both are square matrix
b) both have same ~~or~~der
c) no. of columns of A is equal to columns of B.
d) no. of columns of A is equal to no. of rows of B.

47 In a matrix multiplication for A and B $(AB)^T$ = ____

a) $A^T B^T$ b) $B^T A^T$ c) AB d) $A^T + B^T$

48. If A is a matrix of order mxn and B is a matrix of order nxp then the order of AB is ____.

a) mxn b) pxn c) nxp d) mxp

49. If order of A is 4x3, order of B is 4x5 and order of C is 7x3 then the order of $(A^T B)C^T$ is ____

a) 5x3 b) 4x5 c) 5x7 d) 4x3

50. ~~Ff~~ Find x+y, if $\begin{bmatrix} 2x & 5 \\ 7 & -y \end{bmatrix} = \begin{bmatrix} 8 & 5 \\ 7 & 3 \end{bmatrix}$.

a) 4 b) 1 c) -3 d) 6

51 For a matrix multiplication, Is AB = BA ?

a) true b) false c) sometimes true
d) sometimes false

52. If $A=\begin{bmatrix}4&5&7\\-2&3&0\end{bmatrix}$, $B=\begin{bmatrix}0&1&4&7\\-2&1&0&5\\3&0&1&4\end{bmatrix}$, find AB.

a) $\begin{bmatrix}7&8&6\\9&6&9\\4&8&9\end{bmatrix}$ b) $\begin{bmatrix}7&8&6\\6&9&6\\4&8&8\end{bmatrix}$ c) $\begin{bmatrix}7&8&6\\6&9&6\\4&8&9\end{bmatrix}$ d) $\begin{bmatrix}7&8&6\\6&9&6\\4&8&9\\4&5&7\end{bmatrix}$

a) $\begin{bmatrix}11&9&23&81\\-6&1&-8&1\end{bmatrix}$ b) $\begin{bmatrix}11&9&81&23\\-6&1&1&8\end{bmatrix}$

c) $\begin{bmatrix}11&9&23&81\\1&-6&-8&1\end{bmatrix}$ d) $\begin{bmatrix}11&9&23&81\\-6&1&1&-8\end{bmatrix}$

53. If $A=\begin{bmatrix}4&1\\2&3\end{bmatrix}$ and $A+2B=A^2$, find matrix B.

a) $\begin{bmatrix}6&4\\7&3\end{bmatrix}$ b) $\begin{bmatrix}7&3\\6&4\end{bmatrix}$ c) $\begin{bmatrix}7&-3\\6&4\end{bmatrix}$ d) $\begin{bmatrix}7&3\\-6&4\end{bmatrix}$

54. If for a square matrix A and B, null matrix O, AB = O implies A = O and B = O

a) true b) false

55 All the diagonal elements of a skew-symmetric matrix is ?

a) 0 b) 1 c) 2 d) any integer

56 If $AB \neq BA$, the matrix multiplicatis is not ____

a) commutative b) Associative c) distributive d) none

57. If $A=\begin{bmatrix}1&2&2\\1&2&2\\2&2&1\end{bmatrix}$, find A^2

a) $\begin{bmatrix}1&4&4\\1&4&4\\4&4&1\end{bmatrix}$ b) $\begin{bmatrix}2&4&4\\1&4&4\\4&4&2\end{bmatrix}$ c) $\begin{bmatrix}7&10&8\\7&10&8\\6&10&9\end{bmatrix}$ d) none

58. If A^T and B^T are the transpose of two matrices A and B, then which of the following is true ?

(a) $(A^T)^T = A$ b) $(A+B)^T = A^T + B^T$

c) $(KA)^T = KA^T$ d) All of the above

59. A square matrix whose determinant is not equal to zero ($|A| \neq 0$), is called _____ matrix.
a) singular b) non-singular c) symmetric d) Equal

60. Find adj. A, if $A = \begin{bmatrix} 2 & 5 \\ 1 & 4 \end{bmatrix}$

a) $\begin{bmatrix} -4 & 5 \\ 1 & -2 \end{bmatrix}$ b) $\begin{bmatrix} 4 & 5 \\ 1 & 2 \end{bmatrix}$ c) $\begin{bmatrix} 4 & -5 \\ 1 & 2 \end{bmatrix}$ d) $\begin{bmatrix} 4 & -5 \\ -1 & 2 \end{bmatrix}$

61 Find the value of :

~~[1 2 3]~~ $\begin{bmatrix} 1 & 2 & 3 \end{bmatrix} \begin{bmatrix} 2 & 3 & 0 \\ 0 & 4 & 9 \\ 9 & 1 & 0 \end{bmatrix} \begin{bmatrix} 2 \\ 5 \\ 1 \end{bmatrix}$

a) [116] b) [146] c) [58 70 18] d) none

62 If AB exists, then $(AB)^{-1}$ = _____
a) $A^{-1}B^{-1}$ b) $B^{-1}A^{-1}$ c) AB d) none

63 If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ then adj. A = _____.

a) $\begin{bmatrix} d & c \\ b & a \end{bmatrix}$ b) $\begin{bmatrix} d & -c \\ -b & a \end{bmatrix}$ c) $\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

d) $\begin{bmatrix} d & b \\ c & a \end{bmatrix}$

64. If A is a singular matrix then adj. A is ____
a) also singular b) non-singular
c) symmetric d) not defined.

65. A ____ has a value.
a) matrix b) determinant c) both a and b
d) none

66. ____ of a square matrix is the transpose of matrix of the co-factors of a given matrix.
a) Inverse b) Transpose
c) Adjoint d) none of these

67. I is a ___ matrix.

a) zero b) Null c) Unit/Identity d) none

68. O is a ___ matrix.

a) Null b) Unit c) Identity d) none

69. If $A = \begin{bmatrix} 1 & -2 \\ 3 & 1 \end{bmatrix}$ then minor of (-2) is ___.

a) 1 b) -1 c) 3 d) -3

70. If $A = \begin{bmatrix} 1 & -2 \\ 3 & 1 \end{bmatrix}$ then the co-factor matrix is ___.

a) $\begin{bmatrix} 1 & 3 \\ -2 & 3 \end{bmatrix}$ b) $\begin{bmatrix} -1 & 2 \\ -2 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & -3 \\ 2 & 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 3 \\ -2 & -1 \end{bmatrix}$

71. The necessary condition for a matrix to have an inverse is that ___.

a) $|A| = 0$ b) $|A| \neq 0$ c) $|A|$ is < 0 d) $|A|$ is > 0.

72. A non-singular matrix can have ___.

a) Adjoint b) Inverse c) square d) All of given

73. If $A = \begin{bmatrix} 4 & -3 \\ 1 & x \end{bmatrix}$ and $|A| = 5$, find x.

a) $-1/2$ b) $1/2$ c) 2 d) $3/2$

74. Find Inverse of A, if $A = \begin{bmatrix} 2 & 3 \\ 5 & -7 \end{bmatrix}$

a) $\begin{bmatrix} 7/29 & 3/29 \\ 5/29 & -2/29 \end{bmatrix}$ b) $\begin{bmatrix} 7/29 & 3/29 \\ -5/29 & 2/29 \end{bmatrix}$

c) $\begin{bmatrix} 7/29 & -3/29 \\ -5/29 & 2/29 \end{bmatrix}$ d) none of these

75. If $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ then $A^2 =$ ___

a) 2A b) 3A c) 4A 5) A.

76. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 5 & 1 \end{bmatrix}$ then $AB =$ _____.

a) $\begin{bmatrix} 12 & 3 \\ 26 & 7 \end{bmatrix}$ b) $\begin{bmatrix} 3 & 12 \\ 26 & 7 \end{bmatrix}$ c) $\begin{bmatrix} 12 & 3 \\ 7 & 26 \end{bmatrix}$ d) none

77. If $A = \begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$ then $A^2 =$ _____

a) $\begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 25 & 0 \\ 0 & 25 \end{bmatrix}$ d) $\begin{bmatrix} 25 & 0 \\ 0 & 0 \end{bmatrix}$

78. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then $A^2 + 5A + 2I =$ _____

a) $\begin{bmatrix} 14 & 20 \\ 30 & 44 \end{bmatrix}$ b) $\begin{bmatrix} 20 & 14 \\ 30 & 44 \end{bmatrix}$

c) $\begin{bmatrix} 14 & 20 \\ 44 & 30 \end{bmatrix}$ d) $\begin{bmatrix} 20 & 14 \\ 44 & 30 \end{bmatrix}$

79. If $\begin{bmatrix} a+5 & b-7 \\ c+3 & d-\frac{3}{2} \end{bmatrix} = \begin{bmatrix} 7 & -5 \\ 5 & 1/2 \end{bmatrix}$ then

Values of a, b, c, d will be _____.

a) $-2, 2, 2, -2$ b) $2, 2, 2, 2$

c) $2, 2, 2, -2$ d) $-2, -2, -2, -2$

80. If $A = [1 \ 2 \ 3]$, $B = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$ then $AB =$ _____

a) $[32]$ b) $|32|$ c) $\begin{bmatrix} 23 \end{bmatrix}$ d) $[22]$

81. A man buys 8 dozen of mangoes, 10 dozens of apples & 4 dozens of bananas. Mangoes cost Rs. 18 per dozen, apples cost is rs. 9 per dozen & banana rs. 6 per dozen. Find total cost.

a) 278 b) 258 c) 852 d) 528

82. Which of the following is true for inverse of a matrix?

a) $(A^{-1})^{-1} = A$ b) $(AB)^{-1} = B^{-1}A^{-1}$

c) $[A^T]^{-1} = (A^{-1})^T$ d) $AA^{-1} = A^{-1}A = I$

e) All of the above

83. If $A = \begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix}$, $B = \begin{bmatrix} a & b \\ 3 & 5 \end{bmatrix}$ and $AB = BA$. what will be values of a and b?

a) 13/2, 3/2 b) $\frac{29}{4}, \frac{3}{2}$

c) $-\frac{13}{2}, -\frac{3}{2}$ d) $-\frac{29}{4}, \frac{3}{2}$

84. Find Inverse of A if $A = \begin{bmatrix} 2 & 3 \\ 4 & 10 \end{bmatrix}$.

a) $\begin{bmatrix} 5/4 & -3/8 \\ -1/2 & 1/4 \end{bmatrix}$ b) $\begin{bmatrix} 5/4 & 3/8 \\ 1/2 & 1/4 \end{bmatrix}$

c) $\begin{bmatrix} 5/4 & 3/8 \\ -1/2 & -1/4 \end{bmatrix}$ d) none

85. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 1 & 2 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then $A^2 - A + I =$ _____

a) $\begin{bmatrix} 7 & 8 & 6 \\ 6 & 9 & 6 \\ 4 & 8 & 9 \end{bmatrix}$ b) $\begin{bmatrix} 7 & 8 & 6 \\ 9 & 6 & 9 \\ 4 & 8 & 9 \end{bmatrix}$ c) $\begin{bmatrix} 7 & 8 & 6 \\ 9 & 6 & 9 \\ 4 & 9 & 8 \end{bmatrix}$

d) none

86. If $A = \begin{bmatrix} 4 & 2 & 0 & 3 \\ 5 & -7 & -2 & 0 \\ 6 & 0 & -3 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 1 & -1 & -2 \\ 4 & -2 & 0 & -3 \\ 3 & 0 & 4 & 0 \end{bmatrix}$.

then find $A + 2B$.

(Ans: $\begin{bmatrix} 4 & 4 & -2 & -1 \\ 13 & -11 & -2 & -6 \\ 12 & 0 & -9 & -1 \end{bmatrix}$)

Answers:

1. a
2. b
3. b
4. c
5. c
6. c
7. c
8. d
9. a
10. a
11. b
12. d
13. a
14. a
15. c
16. b
17. b
18. a
19. b
20. d
21. a
22. d
23. c
24. a
25. a
26. b
27. b
28. b
29. a
30. b
31. a
32. c
33. c
34. b
35. b
36. c
37. a
38. a
39. a
40. b
41. b
42. a
43. d
44. b
45. c
46. d
47. b
48. d
49. c
50. b
51. b
52. a
53. b
54. b
55. a
56. a
57. c
58. d
59. b
60. d
61. b
62. b
63. c
64. a
65. b
66. c
67. c
68. a
69. c
70. c
71. b
72. b
73. b
74. a
75. a
76. a
77. c
78. a
79. b
80. a
81. b
82. e
83. a
84. a
85. a